

Linsu Kim. *Imitation to Innovation*. Cambridge, Mass.: Harvard Business School Press, 1997. vii+303 pages. Hardbound. Price not given.

The Korean development experience presents a successful transition from 'learning-by-doing' to 'learning-by-research'. In his book, Professor Kim explores the dynamics of the Korean companies' technological learning acquisition for technological capability. His main conclusion is that in spite of the favourable impact of public policy and cultural environment, private industry made Korea's ambitious development goals a reality.

To analyse learning at Korean firms, Professor Kim has applied four analytical frameworks. The first framework analyses the technological strategy along dynamically changing technological trajectories. At the specific state of trajectory, it may be relatively easy for catching-up firms to acquire mature foreign technologies, which might be generally available for them to imitate freely or to purchase at a bargain price from foreign suppliers. Rapid industrialisation usually pushes up wages, resulting in the rapid erosion of competitiveness. Consequently, catching-up firms have to compete against advanced countries by creatively adding values on mature products or entering the transition state through enhanced technological efforts. The second framework examines the institutional environment that provides both domestic and international 'sources of technological learning'. The third framework theorises the dynamic learning process at the firm level when a successful firm continues through a spiral process of conversions between explicit and tacit knowledge. To this end, the existing knowledge base and the intensity of efforts are important ingredients in learning. Cumulative learning takes place through learning-by-doing, but discontinuous learning takes place in crisis. Effective learning firms construct a crisis (by setting ambitious targets) intentionally to develop organisational systems and manage their processes to make the crises truly creative. The final framework categorises major modes of technology transfer. The mode of transfer is determined largely by a buyer's absorptive capability. If the buyer has sufficient capability, it can effectively acquire foreign technology without transaction costs and produce knockoffs and clones through reverse-engineering.

The industrialisation strategies of Korea in the 1960s and 1970s were largely associated with duplicative imitations (knockoffs or clones of mature foreign products), with foreign brand names at significantly lower prices. In the 1980s and 1990s, Korean industries were stretching their activities to transform themselves into innovators as well as effectively creative imitators. This involves intensified in-house research and development (R&D) activities and participation in global alliances.

Kim attributes Korea's rapid technological learning to the complex interactions of diverse factors: (1) the government's orchestrating role in directing *chaebols* (conglomerates) and selectively allocating resources to them to achieve ambitious growth objectives in the early years, and its supporting role in lowering

corporate R&D costs; (2) entrepreneurs' can-do spirit exercised freely under restricted equity participation of multinationals; (3) *chaebols* that have advantages in mobilising resources for technological learning; (4) well-trained, hardworking humans who were willing to learn; (5) the continuous inflow of foreign technology through formal and informal mechanisms to facilitate learning; (6) competitive stimuli from the export market; (7) high increases in R&D investment, particularly in the private sector; and (8) government-imposed crises and top management-constructed crises as a major means to expedite technological learning in catching-up.

The Korean experience suggests that a strong government, with competent technocrats and economic advisers, is an essential condition in the early stage of industrialisation for the economy to get off the ground. Government programmes can not be effective without the presence of competitive firms. For example, a restrictive technology transfer policy worked well in Korea at the beginning only because there were independent-minded entrepreneurs and a relatively well-educated workforce determined to expedite technological learning through a reverse-engineering process. The export market is open to all catching-up countries but only a few can take advantage because only a small number can develop the technological ability to tap it. Even crisis imposition or construction cannot lead to creative learning; it would be a disaster were it not for entrepreneurs and their hardworking labour force. Here, socio-cultural factors (the Confucian heritage) and education shape the mind-set and skills of people involved in the economy.

The successful story of Korea's technological learning highlights the fact that it was made possible due to an effective national innovation system, one that is an interactive, and therefore socially-embedded, complex process of diverse formal and informal institutions within the situational and cultural contexts of a nation-state. A system that has an array of well-balanced public programmes which create an economic environment conducive to the smooth inflow of foreign technology is in place and reduces the cost of technological learning, and is also competitive enough to force firms to expedite learning. The system has caused productive interaction not only between government programmes and the private sector but also between suppliers and buyers. Here, socio-cultural factors such as moral and social norms, customs, and traditions that shape habits and routines in an interactive learning process have been as important as formal institutions such as rules, laws, government agencies, banks, and technical support systems.

It may not be easy for a country like Pakistan to follow the Korean development path because the economic environment after the establishment of the World Trade Organisation (WTO) is so different, especially due to the agreements on trade-related investment measures (TRIMS), trade-related intellectual property rights (TRIPS) and Services, and the protectionist policies in the developed countries that will hamper an export-oriented strategy. Nevertheless, Korea's technological

learning has important implications for a technology-recipient country. In short, the availability of local entrepreneurs, successful crisis construction and management, and the capability of local engineers and technicians are important to boost firm-level technological learning. At the national level, government policies on trade, foreign technology transfer, market structure, financial institutions, education, and socio-cultural factors are important. Foreign technology transfer should not be seen as a substitute for in-house efforts. Rather, the two strategies should be complementary. Transfer of technology provides new dimensions in raising knowledge levels and serves as a catalyst for technological change. Foreign direct investment (FDI) does not necessarily transfer innovation capability, particularly when the parent company uses FDI, or a joint venture, to exploit the local market. Packaged foreign licences from a single source involve little risk to the recipient, as the supplier guarantees the performance of the transferred technology. However, it leads to the recipient's adopting a passive attitude towards the learning process. But when the recipient acquires technologies from multiple sources, and assumes responsibility for integrating them into a workable system, the process entails a major risk. This constructs a crisis, which forces and then motivates the recipient to expedite technological learning. For the recipient with adequate tacit knowledge, it is better to follow this path.

In the domain of public policy, Kim recommends proactive measures to provide quality secondary and tertiary education to a country's populace, while the government should assume a decisive role in guiding an economy to create market competition.

For corporate management, the suggested line of action includes creative imitation through search, observation, and assimilation of new knowledge and translation into creative new products and systems; tapping of multiple sources of foreign technologies; continuous up-gradation of the tacit knowledge embodied in human resources; continuous investment in R&D efforts to work on imported technologies; and monitoring of technological changes in advanced countries.

This book provides a very useful analysis of Korea's successful experience of transforming the economy from a producer of imitative products to a producer of technology-intensive products. It is highly recommended here to academics, policy-makers, and business managers.

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